

In the Office action the Examiner rejected claims 9 and 10 under 35 U.S.C. 112, second paragraph as being indefinite due a number elements lacking antecedent basis. The amendment to claims 9 and 10 corrects these informalities.

In the Office action the Examiner rejected claims 9 and 10 under 35 U.S.C. 103(a) as being obvious over either of Michaelis (Atomkernenergie 14.Jg. (1969)) or Phillips et al. (Analytical Chemistry, Vol. 47, No. 1, January 1975) or Gesellschaft Fuer Kernforschung (GB 1,197,099). While none of these references disclose the waterproof casing required by claim 9, the Examiner has stated that it would have been obvious to enclose any device for use in underwater applications in such a casing.

The Examiner has made a bare assertion of obviousness in this rejection. The Examiner has provided no motivation for a skilled practitioner to place the device in a waterproof casing, and the cited references provide no teaching or suggestion to do so. The use of a waterproof casing in the present invention allows examination of nuclear fuel rods in their racks in a water bay, that is, where they are stored normally as long as they are in duty. The prior art seems to teach devices for examining the rods in different circumstances like transport (see Michaelis, introduction, "fissile material now passes through several nuclear installations", "supervision of the flow of fissile material at selected strategic points", etc.). The prior art references do not teach or suggest in-place measurements by a remotely held, portable detector as claimed in claim 9.

Additionally, the prior art proposes rather bulky detectors completely surrounding the fuel rod and comprising a tunnel in which the rod is slid. There is no teaching or suggestion that precise measurements could be made with a displaceable detector anchored at a well-determined position and orientation with respect to the fuel rod on a rack in which the rod is maintained. Phillips discloses an arrangement in which the scanning mechanism can be

moved in all directions x, y, and z, tilted and rotated (see beginning of "Experimental" which seems to contradict the invention's anchoring in promoting a mobile mechanism).

Furthermore, In Gesellschaft fur Forschung, the neutron detectors appear to be arranged around the measuring zone in all directions (see p. 2, lns. 59-61, "the lead shield 6 and liquid scintillator 4 are arranged around the measuring zone of the fuel element 1 in spherical symmetry", and p. 2, lns. 53-55, "the fast neutrons are detected in a 4π geometry"), which suggests that the neutron detectors are arranged around the measuring zone in all directions, preventing use of part of the device for attaching the casing to a boom (or other support member) as required by claim 9. Michaelis contains similar indications (see second page of reference, ln. 35, " 4π geometry" and section 4., "Measuring arrangements": "the lead shell and the scintillator completely surround the measuring zone" and "a number of photomultipliers are mounted on the scintillator".)

Because the cited references do not teach the mounting features and waterproof aspect required by claim 9, and because the Examiner has provided no motivation for a skilled artisan to supply these additional features, claim 9 as amended defines over the cited art. Claim 10 depends from claim 9, and so also defines over the cited art.

New claims 13-16 more positively claim several aspects of the invention. Claim 13 is similar to claim 9 and contains the definition of a unique arrangement of the detectors with respect to the shield of the second radiation, in order to protect the first detector from the unwanted influence of oblique rays coming from top parts of the rod when it is extracted from the rack. Claims 14 and 15 define the collimating arrangement of the second detector more precisely. Claim 16 defines the sliding arrangement of the second detector in the casing.

For these reasons it is believed that the pending claims define over the cited art. A notice of allowance is therefore respectfully requested. Please charge all fees resulting from this communication to our Deposit Account No. 16-0820, our Order No. 33774.

Respectfully submitted,
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Version of Claims 9 and 10 showing changes

9. (Amended) Device for discriminating nuclear fuels in an installation, comprising a structure subjacent to [the] storage cells immersed in a water filled bay, comprising a first detector, (15), of a first type of radiation, a second detector, (16), of a second type of radiation, a waterproof casing, (2), containing the detectors, [whereby it contains the] and means of attaching the casing, (13, 14), to a boom, (3), that descends towards the fuel and [the] means of placing, (6, 9), the casing in a given position on at least one of the cells, (5), adjoining a cell containing the nuclear fuel, (26), that is the subject of the discrimination.

10. (Amended) Device for discriminating nuclear fuels according to claim 9, whereby one of the detectors is a gamma radiation detector located behind two collimators in continuation (25, 31; 32, 34), comprising a rear collimator, located just in front of the said detector and opening up onto the whole detection area of a detection body, and a front collimator, with a slot section extended in [the] a transversal direction of a fuel element.